

ACKNOWLEDGEMENT

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INTRODUCTION

Fermentation typically is the conversion of carbohydrates to alcohol and Carbon dioxide or organic acids using yeasts, bacteria, or a combination these of under anaerobic conditions. A more restricted definition of fermentation is the chemical conversion of sugars into ethanol. The science of fermentation is known as zymology. Fermentation usually implies that the action of microorganisms is desirable, and the process is used to produce alcoholic beverages such as wine, beer and cider. Fermentation is also employed in preservation technique to create lactic acid in sour foods such as sauerkraut, dry sausages, kimchi, and yogurt, or vinegar for use in pickling foods.

USES

Food fermentation has been said to serve five main purpose:-

- Enrichment of the diet through development of a diversity of flavors, aromas, and textures in food substrates.
- Preservation of substantial amounts of food through lactic acid, alcohol, acetic acid and alkaline fermentation
- Biological enrichment of food substrates with protein, essential amino acids, essential fatty acids and vitamins
- Elimination of ant nutrients.
- A decrease in cooking times and fuel requirements.

RISKS OF CONSUMING FERMENTED FOODS

Food that is improperly fermented has a notable risk of exposing the eater to botulism. Alaska has witnessed a steady increase of cases of botulism since 1985. Despite its small population, it has more cases of botulism than any other state in the United States of America. This is caused by the traditional Eskimo practice of allowing animal products such as whole fish, fish heads, walrus, sea lion and whale flippers, beaver tails, seal oil, birds, etc. to ferment for an extended period of time before being consumed. The risk is exacerbated when a plastic container is used for this purpose instead of the old fashioned method, grass lined hole, as the botulinum bacteria thrive in the ~~areas~~ anaerobic conditions created by the air tight container enclosure in plastic.

THEORY

Wheat flour, gram flour, potato juice and Carrot juice contains starch as the major constituent. Starch present in these food materials is first brought into solution in the presence of enzymes diastase, starch undergo fermentation to give maltose starch gives blue violet colour with iodine whereas product of fermentation starch do not give any characteristics colour. When the fermentation is complete the reaction mixture stops giving blue violet colour with iodine solution.

By comparing the time required for completion of fermentation of equal amounts of different substances containing starch the rates of fermentation can be compared.

The enzyme is diastase is obtained by germination of moist barley seeds in dark at 15 degree celsius. When the germination is complete the temperature is raised to 60 degree celsius to stop further growth. The seeds are crushed into water and filtered. The filtrate contains enzyme diastase and is called malt extract.

MATERIAL REQUIRED:-

- Conical flask
- Test tube
- Funnel
- Filter paper
- Water bath
- 1% Iodine solution
- Yeast
- Wheat, ~~flour~~ gram flour
- Potato, Carrot juice
- Aqueous NaCl solution

PROCEDURE

- Take 5 gms of wheat flour in 100 ml conical flask and add 30 ml distilled water.
 - Filter the above contents after cooling, the filtrate obtained is wheat flour extract.
 - To the wheat flour extract. Taken in a conical flask add 5 ml of 1% aq. NaCl solution.
 - Keep this flask in a water bath maintained at a temperature of 50-60 degree Celsius. Add 2 ml of malt extract
 - After 2 minutes take 2 drops of the reaction mixtures and add to diluted iodine solution.
 - Repeat step 6 after 2 minutes. When no bluish colour is produced the fermentation is completed
 - Record the total time taken for completion of fermentation
- Repeat the experiment with gram flour, extract, potato juice extract and Carrot juice extract and record your observations.

OBSERVATION:-

Time required for the fermentation are as follows:-

- Wheat flour - 10 hours
- Gram flour - 12.5 hours
- Carrot Juice - 15 hours
- Potato Juice - 13 hours

CONCLUSION:-

Carrot juice takes maximum time for fermentation and wheat flour takes minimum time for fermentation.

Alcohol production is an important fermentation because it gives ethyl alcohol which is used for consumption as well as industrial purpose.

It gives byproducts like CO_2 , yeast biomass, fertilizer etc. It gives effective utilization of agrowaste eg. Molasses, Sulphite waste liquor etc.

CERTIFICATE

This is to Certify that project file submitted by Satyam Kumar XII PCM.

In partial fulfillment of the credit for the p Chemistry project file evolution from Semstar Global School is the bonafied work of student under guidance and supervision of Mr. Sanjeev Tiwari (Chemistry teacher) of Semstar Global School during 2020-21 as a project file.

Examiner Signature